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MEASUREMENTS OF 12 SPECIMENS OF *Melanerpes formicivorus bairdi*
FROM CALIFORNIA.

				Wing	Tail	Culmen
1,028	♂ ad.	San Fernando Valley, Cala. . .	E. C. Thurber	150	96	31.5
884	♂ ad.	San Gabriel, California	"	145	96	30
44,121	♂ ad.	California (F. Gruber)	Am. Mus. Nat. Hist.	147	97	30.5
44,118	♂ ad.	California (J. Krider)	"	153	93	31
25,661	♂ ad.	Cosumnes River	"	150	92	30.5
929	♂ ad.	Newcastle, California.	George B. Sennett	145	86	33.5
....	♂ ad.	Sebastopol, California	"	150	88	31.5
675	♀ ad.	Alhambra, California	E. C. Thurber	145	87	27.5
884	♀ ad.	San Gabriel, California	"	145	90	28.5
25,662	♀ ad.	California.	Am. Mus. Nat. Hist.	145	84	29.5
930	♀ ad.	Newcastle, California	George B. Sennett	140	81	28
. . .	♀ ad.	Sebastopol, California	"	148	82	28

COMPARATIVE MEASUREMENTS OF THE FOUR SUBSPECIES OF
Melanerpes formicivorus.

Average of <i>M. f. bairdi</i> from California (7 males and 5 females)	147	89	30
Maximum " " " " " " " "	153	97	33.5
Minimum " " " " " " " "	140	81	27.5
Average of <i>M. formicivorus</i> from S. E. Mexico and Central America*	141	89	29.5
Maximum " " " " " " " "	150	91	31
Minimum " " " " " " " "	135	79	28.9
Average of 34 specimens of <i>M. f. aculeatus</i> from Arizona	144	89	29.9
Maximum " " " " " " " "	151	97	29
Minimum " " " " " " " "	137	82	23
Average of <i>M. f. angustifrons</i> from Lower California*	137	86	30.5
Maximum " " " " " " " "	141	89	31.8
Minimum " " " " " " " "	132	84	29.2

OBSERVATIONS ON THE AVIFAUNA OF PORTIONS
OF ARIZONA.

BY EDGAR A. MEARNS, M. D.

(Concluded from Vol. VII, p. 55.)

Dryobates villosus hylscopus. CABANIS'S WOODPECKER. — Breeds commonly throughout the pine belt, often ascending higher in summer, then preferring aspens to the fir and spruce woods of high altitudes. It very rarely descends to the cottonwoods of the Verde Valley to fraternize with its smaller relative, Baird's Woodpecker, and only when the moun-

*Taken from Ridgway's Manual of North American Birds.

tain timber is icy or the weather uncommonly fierce; then it is usually accompanied by flocks of Cassin's Purple Finches, Red-backed Juncos, and its boon companions, the Slender-billed Nuthatches. About the middle of June the young leave their nests, and soon after make a partial migration downward towards the lower border of the pine belt, in common with many other birds that breed at high levels.

Dryobates pubescens oreæcus. BATCHELDER'S WOODPECKER. — This bird breeds sparingly through the *Pinus ponderosa* belt, ascending into the spruce zone on the San Francisco cone. It is the rarest of the Woodpeckers here enumerated. A male selected a sounding dry aspen, and drummed regularly above my camp, high up on San Francisco Mountain during the early part of June, 1887, at which season the nights were still intensely cold and this species was probably not yet breeding.

Picoides americanus dorsalis. ALPINE THREE-TOED WOODPECKER. — Breeds commonly throughout the pine belt, seldom ascending far into the spruce woods of the highest peaks. On the northwestern slope of San Francisco Mountain I discovered a nest of this species on June 8, 1887. The female was seen alone, pecking at a large yellow pine which, although dead, still retained its bark and was quite solid. While feeding, she uttered a peculiar, harsh, nasal cry. I shot her, and then noticed a small, neatly bored hole in the south side of the pine trunk, about thirty feet from the ground and away from branches. With the aid of a rope, and taking a start from the saddle, I was scarcely able to climb to the nest, which the male did not quit until I was well up; then he came out and uttered a sudden, sharp *whip-whip-whip* in a menacing tone, remaining hard by while I worked with saw and chisel. It took me nearly half an hour to make an opening sufficiently large to admit the hand, as the burrow was situated so extraordinarily deep. Two young, male and female, with feathers just sprouting, were found on a bed of small chips at the bottom of a burrow, not more than eight inches lower than the entrance, but in the very heart of the tree, the cavity being oblique and pear-shaped, and having the strong odor characteristic of Woodpeckers' nests in general. Both parents and their progeny were preserved, and are now in the American Museum collection. The irides of the adults were dark cherry-red; their feet, claws and basal half of mandible plumbeous, the rest of the bill being plumbeous black.

Sphyrapicus thyroideus. WILLIAMSON'S SAPSUCKER. — Breeds very commonly at the highest altitudes, frequenting the spruce and fir woods. It seldom descends far into the pine belt during the breeding season, although it is found in the pines in winter, occasionally descending even to the cedars in severe weather; and after the nesting season it frequently roves down to the pine woods with its young. When shot, it usually fastened its claws into the balsam bark and remained hanging there after life was extinct.

The specimens of this bird procured during the breeding season exhibit certain peculiarities of plumage, as compared with Pacific coast examples and winter migrants to Arizona, which, if constant, would warrant

the separation of the resident Arizona bird as a subspecies. It is somewhat smaller than northwestern specimens, and much blacker, the white being more restricted throughout. In some males no white spots are visible on the outside of the primaries or secondaries, even when the wing is spread; the white bars on the axillars, lining of wings, and sides are much more restricted; the under tail-coverts are black, very narrowly edged with white; the white head stripes are narrower; and there is no concealed white in the interscapular region. One male (No. 5574, Baker's Butte, Arizona, July 23, 1887) has the belly sap-green, instead of the usual citron-yellow. The adult female is likewise darker, the dark areas being broader, and the white proportionately reduced. In Californian specimens the light bands on the back, wings, and sides are brownish, similar to the head, while they are nearly white in breeding females from Arizona. The pectoral patch is also more solidly black in the Arizona bird. A young female (No. 5559) in first plumage taken in the Mogollon Mountains, Arizona, July 18, 1887, has strong indications of the yellow belly. Its plumage is duller than in the adult of the same sex, lacks the black chest patch, and has the white bars replaced by brown similar in color to the head. A much younger specimen (No. 5552), sex undetermined, has a narrow band of brownish white, slightly tinged with greenish yellow, down the middle of the belly, in other respects agreeing with the preceding. Some winter specimens from Arizona are indistinguishable from others from Fort Crook, California. These might be regarded as northern migrants; but one male from the last-named locality lacks the white spots on the wing quills, as in Arizona specimens; and one Arizona resident has as much white spotting as the average from California. In making the comparison of these birds, I have examined all the material in the National Museum at Washington, in the American Museum of Natural History of New York, and in several private collections. I am also under obligations to Dr. C. Hart Merriam for the opportunity of examining the series of specimens of this Sapsucker collected by him in Arizona, and belonging to the biological collections of the U. S. Department of Agriculture. As the result, it may be stated that the differences described appear to be largely individual, to some extent geographical, and possibly dependent somewhat on season; but the material available for study is insufficient to enable me to decide how much is due to each of these influences. The series of Arizona summer specimens averages darker, with the pale tints whiter. The difference cannot be wholly due to season, unless several of the specimens examined from other localities have erroneous labels.

Melanerpes formicivorus aculeatus.—A very common resident through the pine belt, breeding plentifully. I have found it as high as the spruce forests, but never in them. It is essentially a bird of the pines, only occasionally descending to the cottonwoods of the low valleys. The oaks which are scattered through the lower pine zone supply a large share of its food. Its habit of industriously hoarding food in the bark of pines, and in all sorts of chinks and hollows, is well known. These

stores are the source of unending quarrels between this Woodpecker and its numerous pilfering enemies; and I have laid its supplies under contribution myself, when short of provisions and lost from the command with which I had been travelling, by filling my saddlebags with half-dried acorns from under the loose bark of a dead pine.

Melanerpes torquatus. LEWIS'S WOODPECKER.—It may be said that the pine forests are the favorite home of this beautiful species, although its habits are so erratic that one must take counsel before making any positive assertion concerning it. I have never had proof of its breeding anywhere in Arizona, although I have found it at all seasons and places. It is a wandering bird, travelling about, usually in large flocks, and visiting all likely places for food and frolic. In midwinter it is often very abundant in the highest pine forests of the Mogollons and about Fort Whipple; but I have spent a whole summer in these mountains without seeing any of them; again, it was noted among the cottonwoods of the Santa Cruz and Rillitto in the vicinity of Tucson and Fort Lowell during the blazing weather of April. Sometimes it would come in great numbers in March and April to the oak woods bordering the streams near Fort Verde; or a pair or two would take up their abode in a grove of cottonwoods, and spend April and May, in the hot valley of the Rio Verde. Its movements, like those of the Eastern Red-headed Woodpecker, are probably largely governed by the food supply; and it doubtless breeds wherever it chances to be at the season, provided that food be plenty.

Colaptes cafer. RED-SHAFTED FLICKER.—Breeds commonly throughout the pine belt, ascending still higher.

Phalacroptilus nuttalli. POOR-WILL.—This interesting bird breeds abundantly throughout the pine belt. A set of perfectly fresh eggs was taken on the Mogollon Mountains, on July 3, 1886. Another set, taken near Flagstaff, contained large embryos on May 27, 1888; and a couple of young were found the same day.

Chordeiles virginianus henryi. WESTERN NIGHTHAWK.—I have never known this species to infringe on the territory of the Texan Nighthawk during the breeding season; each keeps to its own ground, the latter being confined to the region below the pines, and the former residing in the pines and spruces, breeding in great numbers in these limited areas. A single migrant was taken at Fort Verde, on May 9, 1885. Two fresh eggs were taken at Flagstaff on June 18, 1887, in a level place, bestrewn with volcanic scoria, beneath the pines. In our summer camp, near the summit of the Mogollon Mountains, a small beetle was annoyingly abundant, flying into our tents in great numbers during the day, and at night swarming around our log fires. As the twilight gathered, hundreds of these Nighthawks appeared upon the scene, preying upon the troublesome insects. Careless of our presence at the fires and of the noisy hilarity of camp, they flitted through the smoke with astonishing freedom from diffidence, capturing myriads of the hated beetles, as they passed and repassed above, between, and around us, until their flickering forms

were as familiar as the stirring of the pine boughs overhead, and the fanning of their wings almost as little heeded. A couple of young, recently hatched, were found near the camp, on July 27, 1887, showing that two broods are reared the same year or that its season of reproduction is quite protracted. The voice of this species is quite unlike that of *Chordeiles texensis*.

Micropus melanoleucus. WHITE-THROATED SWIFT. — In Arizona this large and handsome Swift is very abundant in the vicinity of cañons and cliffs, in which it breeds from the altitude of Fort Verde (about 3400 feet) up to the highest peaks in the Territory. I saw them wheeling around the highest points of the San Francisco Mountains, and darting in and out of the jagged rocks, in June.

Trochilus alexandri. BLACK-CHINNED HUMMINGBIRD. — A summer resident in the zone of *Pinus ponderosa*; not seen higher.

Trochilus platycercus. BROAD-TAILED HUMMINGBIRD. — This beautiful Hummingbird is an inhabitant of the highest land of Arizona, being rarely encountered until one is well within the spruce belt, when it suddenly becomes extremely plentiful. About springs and willow-edged water-courses swarms of these gay birds congregate. Its boldness is without a parallel; it knows no fear. A member of our party on San Francisco Mountain wore a scarlet cap, but he found these audacious birds so troublesome from their constant attacks upon it that he was glad to pocket it in order to be rid of the irate little furies. A shrub grows on the mountain bearing purplish red flowers of which this species is extravagantly fond; and numbers of them may be closely watched by seating oneself amongst these plants. Its flight is accompanied by a metallic, screeching sound unlike that made by any other Hummer with which I am familiar, and I heard them continually, when riding through the forest, though they were invisible. It ranges to the very summit of San Francisco Mountain, being abundant in the highest timber.

Tyrannus vociferans. CASSIN'S KINGBIRD. — Breeds commonly throughout the pine forests. I found it in the uppermost timber on San Francisco Mountain in June, the altitude being nearly 12,000 feet. This conspicuous species likewise breeds in the low valleys of Arizona together with the Arkansas Kingbird (*T. verticalis*), nests of both species having been found at the same time in one cottonwood tree in the Verde Valley. On the Mogollon Mountains I saw them attack Crows and Western Red-tailed Hawks and drive them from the neighborhood of their nests after the spirited fashion of the Eastern Kingbird.

Contopus borealis. OLIVE-SIDED FLYCATCHER. — Breeds throughout the area under consideration, but is especially common in the higher belt of evergreen forest, in which it ranges almost to the timber line. It builds its nest near the tops of the tallest firs and balsams. Its characteristic cry of *whip-me-to*, given with such vigor and clearness of enunciation as to be almost startling, was continually heard when we were encamped at Smith's Big Spring, in the cañon or crater enfolded by the San Francisco peaks, opening to the east; and it was equally abundant in

the White Mountains and the higher spurs of the Mogollon range. Like many other mountain species it ranges down hill with its young after the breeding season. On Oak Creek, in the cypress belt below the pines, it appears in families during the first half of August.

Contopus pertinax. COUES'S FLYCATCHER.—This bird was seen feeding its young on Baker's Butte, one of the higher spurs of the northern part of the Mogollon range, during the months of July and August. Its habits resemble those of the smaller species of this genus, rather than of the Olive-sided Flycatcher.

Contopus richardsonii. WESTERN WOOD PEWEE.—Breeds commonly throughout these mountains.

Empidonax difficilis. WESTERN FLYCATCHER.—Breeds commonly in the upper pines and through the spruce forest, almost reaching the timber line on San Francisco Mountain. It has a song and a very sweet call, besides a sharp chirp uttered when angry or frightened.

Empidonax pusillus. LITTLE FLYCATCHER.—This interesting bird, so abundant in the cottonwood and willow thickets along the lower streams of Arizona, was also occasionally seen, during the summer months, in the dwarf willows (*Salix rostrata*) that border the tiny streams and swampy hollows sometimes met with in traversing these mountains. It was noted at the altitude of 9000 feet at the foot of the San Francisco peaks.

Otocoris alpestris adusta. SCORCHED HORNED LARK.—The Horned Larks which were found breeding in the park-like openings in these mountain forests up to an altitude of 10,000 feet, have recently been referred to this race by Mr. Jonathan Dwight, Jr., in his monograph of this species, published in 'The Auk' for April, 1890. The form breeding in the neighboring valleys and low desert regions is also *adusta*, but not typical, tending considerably toward the more northern race *arenicola*; there would have been good grounds for the presumption that the bird breeding in these high mountain districts would prove to be typical *arenicola*; but such is not the fact.

Cyanocitta stelleri macrolopha. LONG-CRESTED JAY.—Resident to the altitude of 10,000 feet, ascending still further. On the San Franciscos, I found its nest with fresh eggs at the upper limit of the pines in the second week of June, 1887, while the nests found in the lower Mogollons during the last third of May of the same year all contained young.

Perisoreus canadensis capitalis. ROCKY MOUNTAIN JAY.—A quite common resident in the White Mountains of eastern Arizona; not seen in the northern Mogollons or the San Franciscos.

Corvus corax sinuatus. AMERICAN RAVEN.—Most of the Ravens of Arizona are the White-necked species, but the northern Raven is common in the mountain districts, nesting as low as 3000 feet, usually, if not invariably, upon ledges of cliffs.

Corvus americanus. AMERICAN CROW.—Breeds commonly in the pines and spruces throughout this area. It ascends to the timber line, breeding in the higher firs as well as in the pines.

Picicorvus columbianus. CLARKE'S NUTCRACKER.—Breeds abundant-

ly in the fir and spruce belt on the San Francisco cone; but on the crest of the more southern Mogollons, near Fort Apache, I have found it only in October. It breeds quite early, when the mountains are still covered with snow. I started for the San Franciscos on the 20th of May, 1887, but found them so deeply covered with snow that I was obliged to wait a fortnight for the snow to melt. When I reached the mountain the young birds were travelling with their parents. They often descended well into the pines, or ascended to the timber line, according as their fancy suggested. They were tame, noisy, and frolicsome, reminding me, as they played boisterously in the top of some dead tree, of a flock of Red-headed Woodpeckers.

Cyanocephalus cyanocephalus. PINON JAY.—Resident in the pine belt in summer, breeding as high as the upper limit of *Pinus ponderosa*, but descending to the cedars and piñons of the low country in autumn. They are wandering, erratic birds, occurring in immense numbers one season, and as conspicuous by their absence the next. They are highly gregarious; and flocks travelling over a more or less open country have the appearance of rolling along, the hindmost continually passing to the front, the whole flock screaming with cat-like voices. It was common around the base of San Francisco Mountain in June, 1887, the flocks having dispersed in pairs for the purpose of breeding. In July and August they again appeared in flocks composed of from several to many families, frequenting the juniper groves, having performed a downward migration in common with *Coccothraustes vespertina montana*, *Spinus pinus*, *Setophaga picta*, and many other mountain birds. With the approach of autumn, when the young are strong on the wing, they begin their gregarious wanderings over country high and low, sometimes assembling in flocks of thousands.

Molothrus ater obscurus. DWARF COWBIRD.—A common summer resident. Frequently seen accompanying the range cattle that graze on the mountains. Possibly some of the mountain Cowbirds are true *M. ater*, but of this I am uncertain, having shot but few specimens.

Xanthocephalus xanthocephalus. YELLOW-HEADED BLACKBIRD.—This handsome bird is a summer resident in such spots, in this high region, as are suited to its needs. It breeds in vast numbers at Mormon Lake, in the Mogollon Mountains; many of the nests examined by us there contained fresh eggs at the time of our visit—during the last week of May.

Sturnella magna neglecta. WESTERN MEADOWLARK.—Breeds in open, grassy places at any elevation. I have seen it as high as 10,000 feet. These mountain birds are the typical *neglecta* of the north; but, as might have been predicted, the resident Meadowlark of the low parts of Arizona exhibits the effects of its environment in certain peculiarities of plumage, having the pallid, scorched appearance common to most birds of desert regions.

Scolecophagus cyanocephalus. BREWER'S BLACKBIRD.—Breeds abundantly in dwarf willows (*Salix rostrata*) through the pine belt, where-

ever there is water. It was sometimes found nesting in aspens, pines, or spruces along streams, but its preference is for wet openings where there are willows. At Woods' stock ranch, on the road from the Verde Valley to Flagstaff, near the lower edge of the pine forest, most of the young were on wing by the 20th of June, 1886, many of them having tufts of down still adhering to the feathers, which gave them a comical aspect. A single nest contained eggs, four in number, nearly fresh; it was placed six feet above the ground in a young aspen (*Populus tremuloides*), and was coarsely fashioned of small twigs and stems of plants, with a lining of rootlets. At Mormon Lake, a more elevated locality than the above, all of many nests examined contained fresh eggs the last of May, 1887. At the base of San Francisco Mountain several pairs were found that were just building nests in the early part of June. On the mountains, as elsewhere, this bird likes the company of cattle.

Coccothraustes vespertina montana. WESTERN EVENING GROSBEAK.—This beautiful Grosbeak is partial to cañons, shady ravines and the vicinity of water during the breeding season, afterwards descending to the oak-wooded foot-hills with its young. At Fort Verde it sometimes appeared, in spring or fall, in the cottonwoods bordering the Verde River, feeding at times upon the berries of a species of mistletoe (*Phoradendron flavescens*), when it became exceedingly fat; but it was much more common in the neighboring foot-hills. In winter it feeds extensively on hackberries, seeds of the box-elder (*Negundo aceroides*), and the berries of several species of juniper.

Carpodacus cassini. CASSIN'S PURPLE FINCH.—A resident of the pines; sometimes driven into the low valleys in great numbers, in winter, by severe weather.

A young fledgling supposed to be *Leucosticte australis*, proves to be another species, and the name should be expunged from page 49 of this paper.

Loxia curvirostra stricklandi. MEXICAN CROSSBILL.—One of the commonest birds in the pine forest, ascending into the spruces. I found it in June at the extreme lower edge of the pine belt. It is notably fond of drinking and bathing, and can generally be found about watering places at all times of the day. I noted the presence of this bird in all parts of the pine belt that I visited, whatever the season. Great numbers were occasionally found congregated around springs, in regions where water is very scarce.

Spinus psaltria. ARKANSAS GOLDFINCH.—A summer resident in the pine belt. Mountain specimens are typical *psaltria*; but those of the surrounding low regions manifest a tendency toward the subspecies *arizonæ*, varying in degree with the locality. Several birds taken in the Verde Valley are referable to *arizonæ*, though the majority are nearer to *psaltria*.

Spinus pinus. PINE SISKIN.—A resident species, frequently descending to the warm valleys in autumn, winter and spring. Although breeding in high places, many flocks may be found to have wandered down to the lower edge of the pines by the first week of July.

Pooecetes gramineus confinis. WESTERN VESPER SPARROW.—A common summer resident in the upper pines. On San Francisco Mountain it was found breeding, in June, up to the altitude of about 10,000 feet, occupying grassy openings where there were a good many rocks.

Chondestes grammacus strigatus. WESTERN LARK SPARROW. — A very common summer resident through the pines. It ranged up to the true base of the San Francisco cone, the country above that point being obviously unsuited to it. It nests indifferently in bushes or upon the ground, and sings sweetly until midsummer.

Zonotrichia leucophrys. WHITE-CROWNED SPARROW. — I found it at the base of San Francisco Mountain, apparently breeding, in June. I also shot a bird which I supposed to be *Z. intermedia*, but could not find the specimen. The Intermediate Sparrow is believed to breed wholly north of the United States; but from this circumstance and its late occurrence at Fort Verde (May 11, 1887) it seems not improbable that some breed within our borders, in the higher portions of the Rocky Mountains.

Spizella socialis arizonæ. WESTERN CHIPPING SPARROW. — Breeds abundantly from the lower pines to near the tops of the highest peaks. In June it was found at the elevation of 10,000 feet on San Francisco Mountain; and it likewise resides during summer on the highest crests of the Mogollon range.

Junco cinereus dorsalis. RED-BACKED JUNCO.—Typical *dorsalis* breeds very plentifully through the northern Mogollon and San Francisco Mountains, but does not appear until one has ascended a considerable distance into the pine belt. It is the most characteristic bird of this higher region. Sets of fresh eggs were found from May 22 to July 22, 1887, the nesting season varying considerably with the altitude, but the clutch seen on the last date probably belonged to a second brood. A typical nest was found on May 30, 1887, in pine woods near the bottom of a ravine on Mormon Mountain. At a short distance was a deep snow-bank. The male parent flew from the nest, beneath my horse's feet, where I found it concealed in a thick bunch of wire-grass. It was composed of fine roots, stems of plants, grasses, and an occasional feather, loosely put together in the manner of most ground nests. It contained four eggs, of an elongated oval shape, measuring (in millimetres) 15×21 , 15×20.5 , 14.7×21.5 , 15.4×21 . Three of them are marked with lilac and reddish brown on a greenish white ground, the spots forming a circle around the great end; the remaining one differs from the others in having the wreath of spots about the small end.

I found its nest close to the upper edge of timber on San Francisco Mountain about the middle of June, and another nest on the very top of Baker's Butte, containing eggs, on the 22d of July.

Pipilo chlorurus. GREEN-TAILED TOWHEE.—It was not found breeding, but was common through the mountains in May and June. In the latter month I saw it on Mount Humphreys, of the San Francisco group, above 11,000 feet, timber line being at 11,468 feet, and the highest land in Arizona (the summit of Humphreys Peak) 12,568 feet.

Habia melanocephala. BLACK-HEADED GROSBEAK.—Breeds through the pine belt, ranging both higher and lower. It evinces an attachment to oak groves and wooded cañons, but is generally dispersed.

Piranga ludoviciana. LOUISIANA TANAGER.—Breeds throughout the pine zone, ascending higher on the peaks, where it was seen in the highest aspens but a short distance from the line where timber ceases to grow. Owing to its gorgeous plumage and sweet song it figures conspicuously in the alpine avifauna.

Piranga hepatica. HEPATIC TANAGER.—This sweet singer is a common resident of the pine belt, never having been noted by me higher than this. It is best suited, as to residence, with such rocky ravines, hills, and ridges in the pine district as are wooded with oaks, for which trees it has a marked predilection.

Progne subis. PURPLE MARTIN.—An abundant summer resident throughout this high region, especially near water. It usually builds its nest in holes in the largest dead pines, several pairs living in the same tree. The Martin of this region, while differing somewhat from the Eastern bird, is not the subspecies *hesperia* recently described by Mr. Brewster, to whom I am indebted for the means of making the comparison.

Tachycineta thalassina. VIOLET-GREEN SWALLOW.—This exquisite bird is highly characteristic of the wooded mountain regions of Arizona, where it breeds, not only in the hollows of trees, but very frequently in cavities in cliffs. While for the most part retiring to the higher land during the breeding season, a good many pass the summer and breed in the wooded cañons in which there are streams, in the lower country. None were found breeding in the immediate valley of the Verde, in the vicinity of Fort Verde, but they were sure to be found after ascending, for a short distance, any of the tributary streams that flow through cañons from the high plateau. There they usually nest in the limestone cliffs, which form the walls of the cañons. I have since seen them breeding in similar situations in the mineral formation about the hot springs and geysers of the Yellowstone National Park and in the bluff banks of the Big Horn River, in Montana.

Vireo gilvus swainsoni. WESTERN WARBLING VIREO.—A summer resident, breeding in the highest aspen timber on San Francisco Mountain, where it sang incessantly and sweetly. Immediately after the breeding season many of them descend to the lower valleys with their young. In autumn, it commonly resorts to the rank growth of annuals usually found beside streams in the valleys at that season, and is especially abundant in the beds of yellow *Cleome*, in the company of terrestrial Warblers of the genera *Helminthophila*, *Geothlypis*, and *Sylvania*.

Vireo solitarius plumbeus. PLUMBEOUS VIREO.—By its loud song this species is known to be a common denizen of the pine forests of this region; but it keeps so near the pine-tops as to be seldom seen, save by tracing to their source the sweet notes one almost constantly hears when riding through these grand forests, it being one of the most persistent

singers that I have met with. It often visits the spruce woods of the higher zone, a few perhaps breeding there.

Dendroica olivacea. OLIVE WARBLER.—I did not see this Warbler in the San Francisco Mountains, save one that was doubtfully identified on Mt. Kendrick, though it is a common summer resident in the adjacent portion of the Mogollon range, becoming still more abundant to the southward. It rises to the level of the firs, but is most numerous in the upper pines. At Baker's Butte it sang sweetly in July.

Dendroica auduboni. AUDUBON'S WARBLER.—A common summer resident throughout this region, ranging upward to the highest timber. It is never found, in summer, below the level of the pines. It is an excellent singer.

Dendroica graciae. GRACE'S WARBLER.—This beautiful Warbler is preëminently a bird of the pines. It is found as soon as the pine belt is entered, and continues almost to its upper limit; but I did not meet with any in the aspens, firs, or spruces above the pines. In Clark's Valley, between Flagstaff and Mormon Lake, it was seen engaged in nest building on the last of May; it gathered materials for the purpose on the ground, in which situation its nest, when discovered, will perhaps be found. Its song is a sweet warble, frequently uttered from the lower pine boughs. It is very gentle and unsuspicious.

Setophaga picta. PAINTED REDSTART.—This brilliant Warbler inhabits the pine-forested portion of the Mogollon Mountains, descending after the breeding season, to the streams of lower regions. In Tonto Basin, during August, it was found in considerable numbers in the dark cañon of Weber Creek, among the gigantic alders (*Alnus oblongifolia*) bordering that stream. It seemed fond of watching and conversing with its own bright reflection in the inky pools.

Cardellina rubrifrons. RED-FACED WARBLER.—A summer resident from near the lower border of the pine belt to the summit of the Mogollon Mountains. It was not seen on the San Francisco Mountains, but was found breeding about thirty miles south of them.

In 'Birds of the Colorado Valley,' Dr. Coues thus concludes his remarks on this species: "The birds thus introduced by Mr. Henshaw with some particularity to American ornithologists as one of the newest acquisitions, is left, as found, to my readers,—some one of whom, perhaps, may hereafter have his own story to tell of its nest, its eggs, and its nuptial song." Though this story has since been told (see this journal, Vol. V, p. 385), I will narrate my experience in finding the first nest of the Red-faced Warbler that ever fell into the hands of any naturalist.

On the 19th of June, 1886, I was encamped on a southern slope of the Mogollon Mountains, about five miles within the pine belt, in what has been designated the Great San Francisco Forest. Following a small stream into a little cañon between whose rocky walls stood groups of towering spruces and of aspens, the ground beneath thickly sprinkled with violets, strawberries, honeysuckles, and columbines, I entered a side ravine and had stooped to gather some flowering honeysuckles when a

little bird was flushed from its nest upon the side of the bank, close to the trunk of a large spruce. Alighting in a young spruce tree, it uttered a sharp, hard *chip*. It was the first Red-faced Warbler I had ever seen; and its red face, black cap, gray back, and white rump suggested to my mind a miniature of the European Bulfinch. The bird was so fearless, and the place so confined, that I had some difficulty in securing the specimen in good condition. The male was not seen. After a close search an old nest was discovered on the ground; and I was about to conclude that it belonged to my bird and was as yet unfinished, when I descried a small opening close beside it among the stones and pine needles; on parting some blooming honeysuckles (*Lonicera ciliosa*) and moss, I discovered the nest,—most artfully concealed. In it were four eggs, containing small embryos which were easily extracted, the shells being thick and hard. The nest rested on a mass of dry leaves and spruce needles, and was entirely covered up and concealed by the honeysuckles. It is well built, being composed of a neatly felted mass of plant-stems and strips of fine bark, lined with soft vegetable fibres and cow-hairs. Its outside diameter is 130 mm.; depth outside, 55 mm.; inside diameter, 45 mm.; depth inside, 30 mm. The eggs are spotted with reddish brown upon a white ground, the spots being aggregated and heavier about the larger extremity, and those markings underlying the shell having a purplish color. They measure, 16×13 , 15.5×13 , 16×13 , 16×13.5 mm.

Salpinctes obsoletus. ROCK WREN.—A permanent resident from the lower pine region downwards. In summer it ranges to the highest peaks. It was one of the birds noted on the summit of Mount Humphreys in June, 1887, at which time the hollows thereabouts were filled with enormous masses of ice and snow, and fierce storms and high winds were prevalent.

Troglodytes aëdon aztecus. WESTERN HOUSE WREN.—A summer resident throughout the forested areas, ranging almost to timber line. It appeared to be fond of woods of mingled spruces, firs, and aspens on the mountain slopes. In the pine-forested tablelands almost every pile of rocks or fallen tree was inhabited by a pair of these Wrens. In the lumbering region about Flagstaff the finest pines had been felled and left on the ground, in preparation for the saw-mill. Among their branches these little Wrens were skipping merrily about; they were abundant and full of song.

Certhia familiaris montana. ROCKY MOUNTAIN CREEPER.—An abundant summer resident of the spruce, fir and aspen woods of high altitude, ranging to the timber line; much less common in the pines, to which it descends, however, in winter, when it is also occasionally seen in the cedars and piñons of the foot-hills, or in the deciduous timber along the streams in the valleys. In summer I have seen it no lower than 6500 feet, at which altitude it was only observed after the breeding season.

Sitta carolinensis aculeata. SLENDER-BILLED NUTHATCH.—A common summer resident in the pine and spruce belts throughout this region. It

very rarely appeared in the deciduous trees along the Verde River, and only in hard winters. To the cedars, junipers and piñons of the foot-hills it is a more frequent winter visitant.

***Sitta canadensis*.** RED-BREASTED NUTHATCH.—A summer resident in the pine and spruce zones of the highest peaks of the Mogollon and San Francisco Mountains. It was not seen as low as the pine belt, though it doubtless descends from its high abode during the winter.

***Sitta pygmæa*.** PYGMY NUTHATCH.—A summer resident through the pine belt. It is abundant, gregarious, noisy, and curious. It is sure to be an early spectator of any exciting scenes occurring in the feathered community.

***Parus gambeli*.** MOUNTAIN CHICKADEE. — A common summer resident of the pines, ranging well up towards the highest forest growth on the peaks. The only nest examined was found in a cavity in a small aspen, about ten feet from the ground, near a spring, at the height of from 10,000 to 11,000 feet on San Francisco Mountain. It contained half-grown young on the 15th of June. The nest resembled that of the Eastern Black-capped Chickadee, being apparently felted in purse shape of cow and squirrel hair; but I was unable to examine it as thoroughly as I wished without danger of injury to the little ones, for whose welfare the mother showed the greatest solicitude. She was so fearless that I twice caught her in my hand when enlarging the hole to see into the cavity in which the nest was built. This species rarely visited the Verde Valley in winter, though it was more frequently seen in the bordering foot-hills.

***Regulus calendula*.** RUBY-CROWNED KINGLET. — A very abundant summer resident throughout this area, except in the lowest pines where it is rare if occurring at all in summer. I saw it close to the timber line in June. A nest and clutch of fresh eggs were taken in a spruce-tree beneath which my tent had been pitched, at Mehrens' stock ranch in Quaking Asp Settlement, in a notch at the summit of the Mogollon Mountains, on May 26, 1887. It was attached to the end of a horizontal branch upwards of a hundred feet above the ground, where attention was attracted to it by the actions of the parents. Our chief packer, a strong and intrepid climber, secured the nest and eggs, with the parent, having to climb the tree twice and saw off the limb, before the hazardous feat was accomplished. The parents were extremely fearless.

***Turdus aonalaschkæ auduboni*.** AUDUBON'S HERMIT THRUSH.—This, the sweetest mountain songster, is an abundant summer resident in fir and spruce forests, breeding late in May and in June. At Quaking Asp Settlement, near the end of May, a pair was engaged in building a nest in my camp. The nest was saddled on to the middle of the lowest limb of a large spruce, and the birds gathered material for its construction close about my tent with perfect freedom from shyness, accepting proffered bits of cotton for its completion. Like the Wood Thrush, its song is most frequent in the early morning hours, and after showers. The form wintering in the Verde Valley is the Dwarf Hermit Thrush (*Turdus aonalaschkæ*).

Merula migratoria propinqua. WESTERN ROBIN.—An abundant summer resident from the beginning of the pine belt upwards, but never occurring below the pines in summer. It ranges high at times, but is not common above the pine zone. Nests, at the upper edge of pine timber, contained young on the first of June, 1887. Its fine song continues until July.

Sialia mexicana. WESTERN BLUEBIRD. — A very abundant summer resident from the lower pines upward into the spruce belt, but not ascending as high on the peaks as the following species.

Sialia arctica. MOUNTAIN BLUEBIRD. — This lovely bird, though less abundant than the preceding, is a common summer resident throughout the area under discussion, breeding even below the summer range of the Western Bluebird. May 21, 1887, I took a set of five eggs, with the female parent, from a cavity in a rough-barked juniper (*Juniperus pachyphlœa*), just below the pines, on the Mogollon Mountains, near Stoneman's Lake. It was commonly seen on San Francisco Mountain during June, ranging up to the highest erect timber; the uppermost has a prostrate habit, due to the pressure of masses of snow and ice upon it during the greater part of the year.

TWO SPECIES OF SWALLOW NEW TO NORTH AMERICA.

BY W. E. D. SCOTT.

DURING a short visit to the Dry Tortugas, Florida, in the latter part of March and early April of the present year, 1890, it was the writer's good fortune to secure two species of Swallow, which up to the present time have not been recorded as occurring in North America.

The records are as follows:

Petrochelidon fulva (*Vieill.*). CUBAN CLIFF SWALLOW.*

Coll. of W. E. D. S., No. 8401, ♂ ad., Garden Key, Dry Tortugas, Florida, March 22, 1890. No. 8492, ♂ ad., same locality, March 25, 1890.

*For description of species see Cory, Auk, Vol. III, p. 57.